

## The Genus *Tachydromia* Meigen (Diptera: Hybotidae) from Australia

PATRICK GROOTAERT<sup>1</sup>\* AND IGOR SHAMSHEV<sup>2</sup>

<sup>1</sup> Department of Entomology, Royal Belgian Institute of Natural Sciences,  
Rue Vautier 29, B-1000, Brussels, Belgium  
Patrick.Grootaert@naturalsciences.be

<sup>2</sup> All-Russian Institute of Plant Protection,  
shosse Podbel'skogo 3, 188620, Pushkin, St. Petersburg, Russia  
shamshev@mail.ru

**ABSTRACT.** First data on the genus *Tachydromia* Meigen from Australia are provided including descriptions of five new species: *T. australiensis* n.sp. (New South Wales), *T. bickeli* n.sp. (New South Wales), *T. carnarvonensis* n.sp. (Queensland), *T. corticola* n.sp. (New South Wales, Queensland), *T. nowendociensis* n.sp. (New South Wales). Hypothesized phylogenetic relationships of the new species (also *T. papuana* Grootaert known from Papua New Guinea) are briefly discussed. A key to Australasian *Tachydromia* is provided.

GROOTAERT, PATRICK, & IGOR SHAMSHEV, 2011. The genus *Tachydromia* Meigen (Diptera: Hybotidae) from Australia. *Records of the Australian Museum* 63(1): 103–112.

### Introduction

This paper continues the world revision of the genus *Tachydromia* Meigen recently initiated by the authors (Shamshev & Grootaert, 2008). The genus is almost worldwide in distribution and currently includes 110 described species. However, only one species of *Tachydromia* has been described from the entire Australasian region, namely *T. papuana* Grootaert, 1987 from Papua New Guinea. Consequently, we provide here the first data on the genus from Australia including descriptions of five new species taken there. Additionally, a new record of *T. papuana* from Papua New Guinea is reported.

### Materials and methods

This study is based on material borrowed from the Australian Museum, Sydney (AMS), the Bernice P. Bishop Museum, Honolulu, Hawaii (BPBM), the Queensland Museum, Brisbane (QMB), the Canadian National Collection of Insects, Ottawa, Ontario (CNC), and the Royal Belgian Institute of Natural Sciences, Brussels (RBINS). Pinned specimens were examined, of which most material was collected in Malaise or sticky traps and then was dried from alcohol. Terms used for adult structures primarily follow those of McAlpine (1981), although the terminology for the antenna follows Stuckenberg (1999); and for the male terminalia follows Sinclair & Cumming (2006). To facilitate observations, the terminalia were macerated in cold 10% KOH and hot 85% lactic acid and immersed in glycerine. Drawings of morphological features were made with a camera lucida attached to a compound microscope.

\* author for correspondence

In descriptions, right and left side of the male terminalia are based on the unrotated position viewed posteriorly, such that in the illustrations the right surstylus appears on the readers left side and the left surstylus appears on the readers right. All male terminalia are figured in their unrotated position. Compared with other biogeographic realms the Australasian

species of *Tachydromia*, especially those of Continental Australia, are very uniform externally and cryptic, often difficult to distinguish. Each specimen requires careful comparison because separation of Australian sympatric species is based on slight differences in leg colouration, and shape and form of the male terminalia.

### Key to *Tachydromia* from Australasia

- 1 Palpus with short subapical seta, which is shorter than palpus.  
Thorax largely shining ..... 2
- Palpus with very long subapical seta, which is 1.5–2.0 times as  
long as palpus. Thorax entirely pollinose ..... 3
- 2 Prothoracic sclerites (including anterior part of postpronotal lobe)  
densely silvery grey pollinose (Australia) ..... *T. carnarvonensis* n.sp.
- Only prosternum densely silvery grey pollinose (Papua New Guinea) ..... *T. papuana* Grootaert
- 3 Fore and mid femora entirely yellow to dusky yellow, hind femur  
yellowish basally (Australia) ..... *T. corticola* n.sp.
- All femora partly brown ..... 4
- 4 Fore femur almost entirely brown, yellowish on extreme apex  
(Australia) ..... *T. australiensis* n.sp.
- Fore femur at least broadly yellowish basally ..... 5
- 5 Fore femur with broad brown ring on apical half (except narrow  
subapical space) (Australia) ..... *T. bickeli* n.sp.
- Fore femur brownish on about apical half (broader dorsally)  
(Australia) ..... *T. nowendociensis* n.sp.

### *Tachydromia australiensis* n.sp.

Fig. 1

**Type material.** HOLOTYPE ♂, Australia, New South Wales, Wentworth Falls, Jamison Ck., cascades, 3.01.1994, B.J. Sinclair (AMS 264358). PARATYPES: 3 ♀♀, Wentworth Falls, Blue Mts, 6 Dec 1986, D.K. McAlpine, K.C. Khoo, R. de Keyser; AMS K258731, AMS K258890 and AMS K258749; 1 ♀, 10 km SE Nowendoc, 850 m, on tree trunk, 25.03.1985, D.J. Bickel, AMS K258828.

**Diagnosis.** Recognized by almost entirely brownish legs; fore femur yellowish on extreme apex.

**Description.** *Male* length: body 1.9 mm, wing 1.8 mm. *Head* black in ground-colour. Eyes with posterior margin produced far beyond ocellar tubercle; vertex narrower than frons in front of ocellar tubercle. Occiput including vertex almost entirely densely greyish pollinose, with shining patch behind mouth-opening; 2 inclinate, rather short, black postvertical setae, some pale setae around neck and near mouth-opening and row of minute postoculars. Ocellar tubercle pollinose, with 2 short laterocline setae. Frons greyish pollinose, slightly widened toward ocellar tubercle, above antennae nearly as broad as anterior ocellus. Antenna with scape and pedicel brownish yellow, postpedicel and stylus missing in holotype. Palpus unmodified, slender, rounded apically, shorter than proboscis, brownish; lacking silvery setae, with some scattered black setulae and bearing very long (nearly 1.5 times as long as palpus) black subapical seta. *Thorax* black in ground-colour, entirely greyish pollinose. Postpronotal lobe large, lacking conspicuous setae, with some minute setulae. Mesonotum with 1 notopleural (accompanied

with 1 short setula anteriorly), 1 minute hair-like postalar and 2 scutellars (nearly as long as notopleural seta); some minute setulae present behind postpronotal lobe; mesosternum and metasternum bare between posterior four coxae. Acrostichals minute, arranged in 2 regular rows, ending before prescutellar depression. Dorsocentrals uniserial, mostly minute, prescutellar pair somewhat longer. *Legs* long, slender, almost entirely brownish; fore femur on extreme apex and knees yellowish; fore tibia and basal 2/3 of hind tibia brownish yellow, all tibiae paler dorsally; fore tarsomeres 1–3 yellowish, tarsomeres 4–5 brownish, mid and hind tarsomere 1 largely yellowish (except narrowly on apical part). Coxae mostly with short pale hair-like setae, bearing some longer and stronger setae apically (in some paratypes black subapical setae present), finely pollinose. Fore femur strongly thickened, pale pubescent ventrally, with pale and dark anteroventral and posteroventral setulae becoming longer basally. Fore tibia slightly spindle-shaped. Mid femur slender, slightly swollen on basal half, with rows of anteroventral and posteroventral spinule-like setulae on swollen part. Mid tibia slightly thickened toward apex, lacking subapical projection, with ventral spinule-like setulae. Hind leg unmodified, lacking prominent setae. *Wing* normally developed, rounded at apex, with unmodified venation; two broad brown bands connected on cells  $r_1$  and  $r_{2+3}$  leaving narrow basal (except extreme base), apical and median hyaline spaces. One short costal bristle present. Vein  $R_{2+3}$  straight. Veins  $R_{4+5}$  and  $M_{1+2}$  parallel toward wing-apex. Crossveins r-m and bm-cu separated. Calypter pale coloured and fringed. Halter with whitish knob and brownish yellow stem. *Abdomen* largely black in ground-

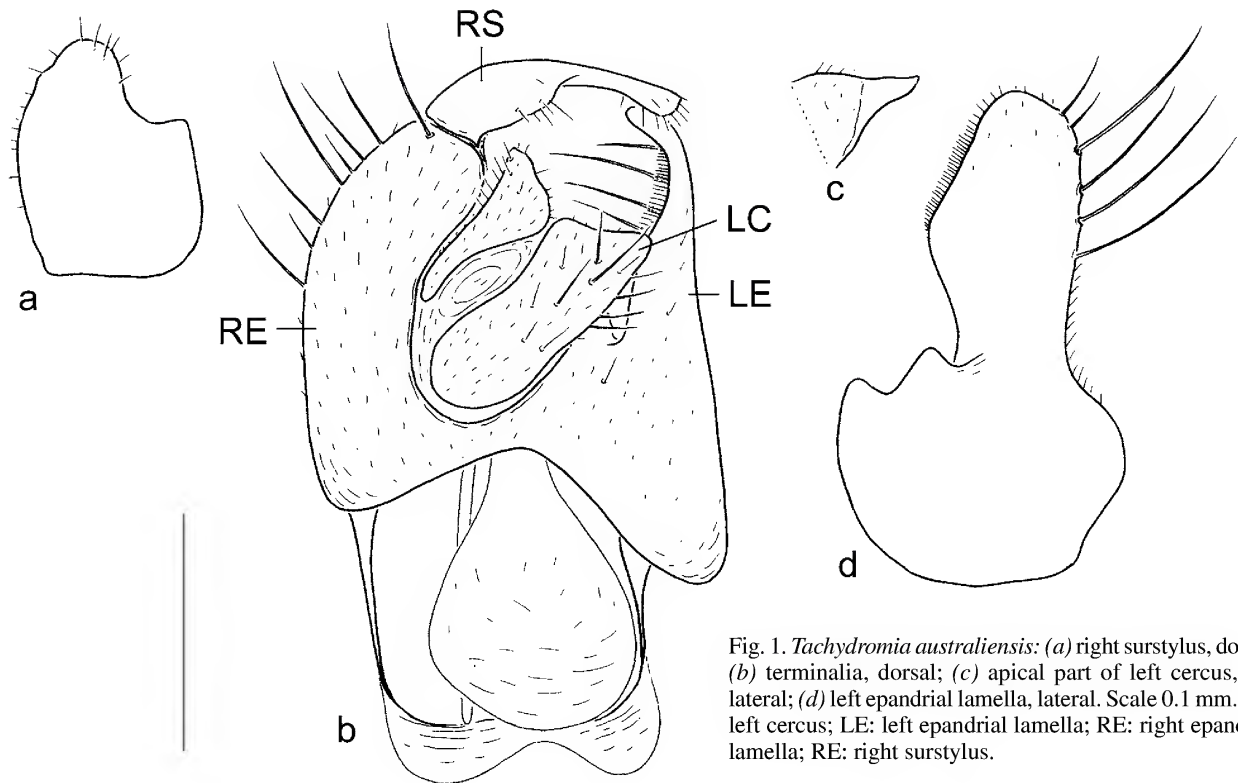


Fig. 1. *Tachydromia australiensis*: (a) right surstylus, dorsal; (b) terminalia, dorsal; (c) apical part of left cercus, left lateral; (d) left epandrial lamella, lateral. Scale 0.1 mm. LC: left cercus; LE: left epandrial lamella; RE: right epandrial lamella; RS: right surstylus.

colour but with segments 1–2 almost entirely pale yellow leaving narrow brownish traces of sclerotization on tergites; greyish pollinose; covered with scattered black setae longer on pregenital segment. *Terminalia* (Fig. 1) rather small, subglobular, blackish brown. Right cercus subtriangular, with unmodified short setae. Left cercus larger than right cercus, subrectangular viewed dorsally with left upper corner slightly produced and pointed (viewed laterally); with several unmodified setae of different lengths. Right epandrial lamella subtriangular (viewed laterally), lacking ventral subapical process, with several unmodified setae of different lengths. Right surstylus differentiated from epandrium, bent inward, subrectangular but with deep notch on right upper corner, bearing several spinule-like setae apically and on inner side. Left surstylus undifferentiated from epandrium; left epandrial lamella subtriangular, with several very long subapical ventral marginal setae. Hypandrium with 3 very short setae. Phallus short.

**Female.** Antenna with postpedicel and stylus brownish yellow to brownish; postpedicel, drop-like, short, about 1.5 times as long as wide; stylus very long, about 4.0 times as long as pedicel and postpedicel combined. Mid femur unmodified, slender, with rows of minute anteroventral and posteroventral setulae becoming longer basally. Mid tibia slender. Otherwise as in male. Cercus brown, long, slender, covered with minute setulae.

**Etymology.** The new species is named after the continent of its origin, Australia.

**Distribution.** This species is currently known from three localities in New South Wales. According to labels it was collected in the beginning of December and January and at the end of March (last sample on tree trunk, 850 m).

### *Tachydromia bickeli* n.sp.

Fig. 2

**Type material.** HOLOTYPE ♂, Australia, New South Wales, Fenwicks Ck, Doyles Riv. SF, 6.12.1986, D.J. Bickel; AMS K258849. PARATYPES: 1 ♀, same data as in holotype, AMS K258832; 1 ♂, 10 km NE of "Tuglo", 48 km N of Singleton, N.S.W., Dec 1981, B.J. Day, AMS K258761; 1 ♂, 33 km NNE Singleton, "Tuglo", on *E. caniculata*, 17.11.1985, D.J. Bickel, AMS K258793; 1 ♂, Styx River SF, 1300 m Cunawarra Rd nr Georges Ck, cool temperate rain forest, sticky trap on tree, 19–20.12.1998, D.J. Bickel, AMS K258863; 1 ♂, Tuglo, 48 km N of Singleton, 15 Nov. 1985, AMS K258745; 1 ♂, Carrai SF, 31°00'19"S 152°16'24"E, 940 m, E. Tasker, 11.01–16.01.1998, sticky trap on *E. saligna*, CS-PG-018–3, AMS K258876; 1 ♂, Coombadjha Ck, Washpool NP, rainforest, sticky traps trunks, 29°25'S 152°23'E, 12–13.01.2001, D. Bickel, AMS K258813; 1 ♀, Barrington Tops NP, Upper Williams R., 550 m, tree trunk *E. sp.*, 26.01.1987, D.J. Bickel, AMS K258728; 1 ♀, Mt. Royal nr. Singleton, 20 Nov. 1988, B.J. Day, AMS K258739; 1 ♀, Wenikimbe NP, 900 m, Mooraback area, sticky trap snow gum, 17–19.11.1998, D. Bickel, AMS K258727; 1 ♀, Coombadjha Ck, Washpool S.F., 10 Feb. 1982, B.J. Day, AMS K258825; 3 ♀♀, Royal NP, Bela Ck., closed forest, 12.02.1985, D.J. Bickel, AMS K258831, AMS K258838, AMS K258846; 1 ♀, Esk River, nr Iluka, rain forest, 24.11.1985, D. Bickel & G. Cassis, AMS K259315; 1 ♀, Myall Lakes Nat. Park, 22.11.1985, D.B. Bickel & G. Cassis, AMS K258882; 1 ♂, Fenwicks Ck, Dayles River State Forest, 6.xii.1986, 1056 m, D.J. Bickel (AMS); 1 ♀, 33 km NNE Singleton, 17.xi.1985, "Tuglo", D.J. Bickel, on *E. caniculata*.

**Additional material.** NEW SOUTH WALES: 1 ♀, Wentworth Falls, Blue Mts, 6.12.1986, D.K. McAlpine, K.C. Khoo, R. de Keyser; AMS K258744. 1 ♀, Banda Banda FR, 31.10S 152.26E, 1020 m, temporary rain forest, sticky trap *Nothofagus*, 19.11.1998, D. Bickel; AMS K258795. These specimens are in bad condition that is why we did not include them to the paratypes.

**Diagnosis.** Recognized by the fore femur with broad brown ring in apical half leaving narrow, yellow subapical space, mid and hind femora entirely brown.

**Description.** *Male* length: body 1.7–1.9 mm, wing 1.8–1.9

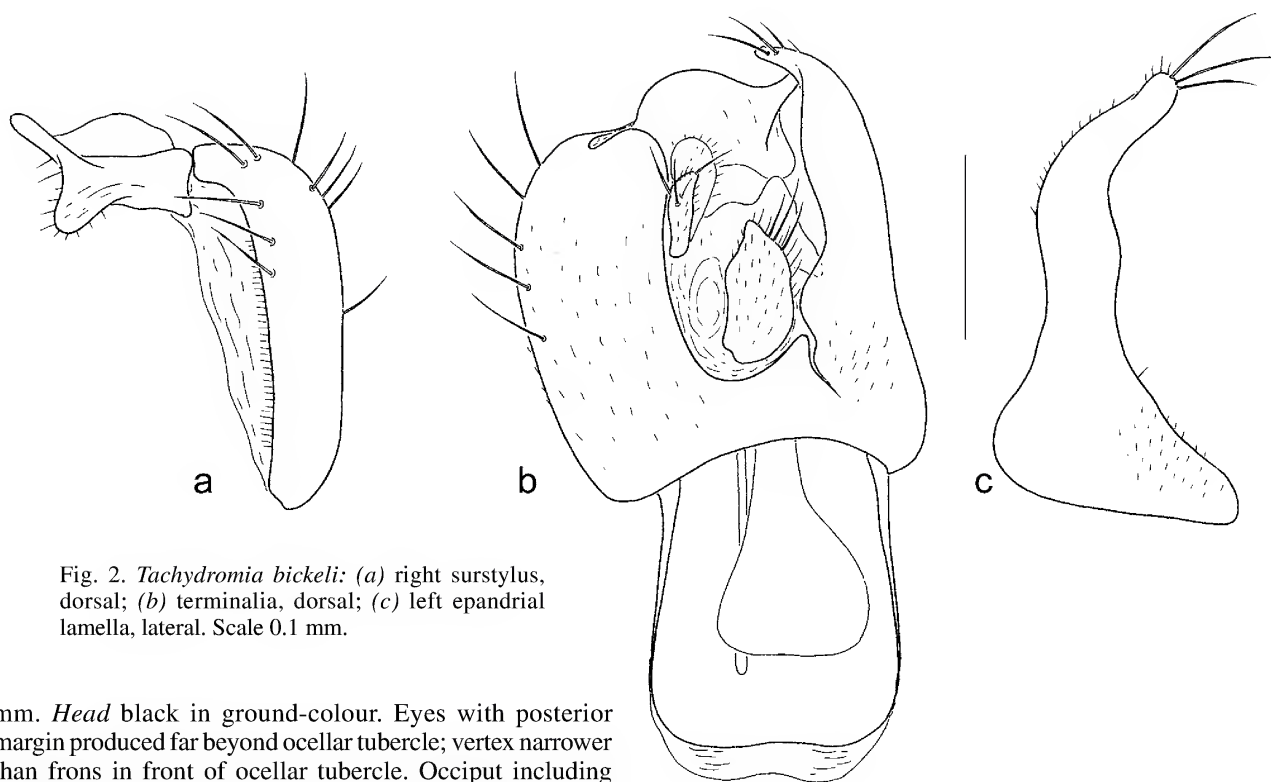


Fig. 2. *Tachydromia bickeli*: (a) right surstylus, dorsal; (b) terminalia, dorsal; (c) left epandrial lamella, lateral. Scale 0.1 mm.

mm. *Head* black in ground-colour. Eyes with posterior margin produced far beyond ocellar tubercle; vertex narrower than frons in front of ocellar tubercle. Occiput including vertex almost entirely densely greyish pollinose, with shining patch behind mouth-opening; 2 inclinate, short, black postvertical setae, some pale setae around neck and near mouth-opening and row of pale minute postoculars. Ocellar tubercle pollinose, with 2 moderately long laterocline setae. Frons greyish pollinose, slightly widened toward ocellar tubercle, above antennae nearly as broad as anterior ocellus. Antenna with scape, pedicel and postpedicel yellow to dusky yellow, stylus brownish. Postpedicel drop-like, short, nearly 1.5 times as long as wide; stylus apical, very long, nearly 3.0 times as long as pedicel and postpedicel combined. Palpus unmodified, slender, rounded apically, shorter than proboscis, brownish; lacking silvery setae, with some scattered black setulae and bearing very long (nearly 2.5 times as long as palpus) black subapical seta. *Thorax* black in ground-colour, entirely finely greyish pollinose. Postpronotal lobe large, lacking conspicuous setae, with some minute setulae. Mesonotum with 1 black moderately long notopleural (accompanied with 1–2 very short setae), 1 minute hair-like postalar and 2 scutellars (nearly as long as notopleural seta); some minute setulae present behind postpronotal lobe; mesosternum and metasternum bare between posterior four coxae. Acrostichals minute, arranged in 2 regular rows, ending before prescutellar depression. Dorsocentrals uniserial, mostly minute, prescutellar pair somewhat longer. *Legs* long, slender, with brown and yellow pattern; coxae and trochanters entirely yellow, fore femur with broad brown ring in apical half leaving narrow subapical space yellow, mid and hind femora entirely brown, fore tibia (except base, apex and dorsal face), mid tibia (except extreme base) and apical 1/4 of hind tibia brown, fore and mid tarsomeres 1–4 yellow, tarsomere 5 brownish to brownish yellow, hind basitarsus yellow (except brownish yellow apex), tarsomeres 2–5 entirely brownish yellow. Coxae with yellowish unmodified setae, finely pollinose. Fore femur strongly thickened, pale pubescent ventrally, with

yellowish anteroventral and posteroventral setulae becoming longer basally. Fore tibia spindle-shaped. Mid femur slender, slightly swollen on basal 1/3, with rows of short brownish anteroventral and posteroventral spine-like setae becoming shorter and disappearing beyond median swelling, bearing 3–4 even stronger black posterodorsal setae just beyond swelling. Mid tibia with hardly prominent apical projection and ventral spinule-like setulae. Hind leg unmodified, lacking prominent setae. *Wing* normally developed, rounded at apex, with unmodified venation; two broad brownish bands connected on cells  $r_1$  and  $r_{2+3}$  leaving narrow basal (except extreme base), apical and median hyaline spaces. One short costal bristle present. Vein  $R_{2+3}$  straight. Veins  $R_{4+5}$  and  $M_{1+2}$  parallel toward wing-apex. Crossveins r-m and bm-cu almost coalescent (in some specimens coalescent). Calypter dusky yellow with concolorous fringe. Halter with yellow stem and pale knob. *Abdomen* largely brown in ground-colour but with segments 1–2 dusky yellow; finely greyish pollinose; covered with scattered black setae longer on pregenital segment. *Terminalia* (Fig. 2) moderately large, rather elongate oval, blackish brown. Right cercus short, narrow, with unmodified short setae. Left cercus larger than right cercus, elongate-oval; with several unmodified setae of different lengths. Right epandrial lamella subtriangular (viewed laterally), lacking ventral subapical process, with several unmodified setae of different lengths. Right surstylus differentiated from epandrium, bent inward, of complicated structure, bearing several unmodified setulae. Left surstylus undifferentiated from epandrium; left epandrial lamella subtriangular, long, narrow, with several very long subapical marginal setae. Hypandrium with 2 very short setae. Phallus short.

*Female*. Tibiae are usually paler than in males and femora even have a tendency to be paler basally. Mid femur unmodified, slender, with rows of short brownish antero-

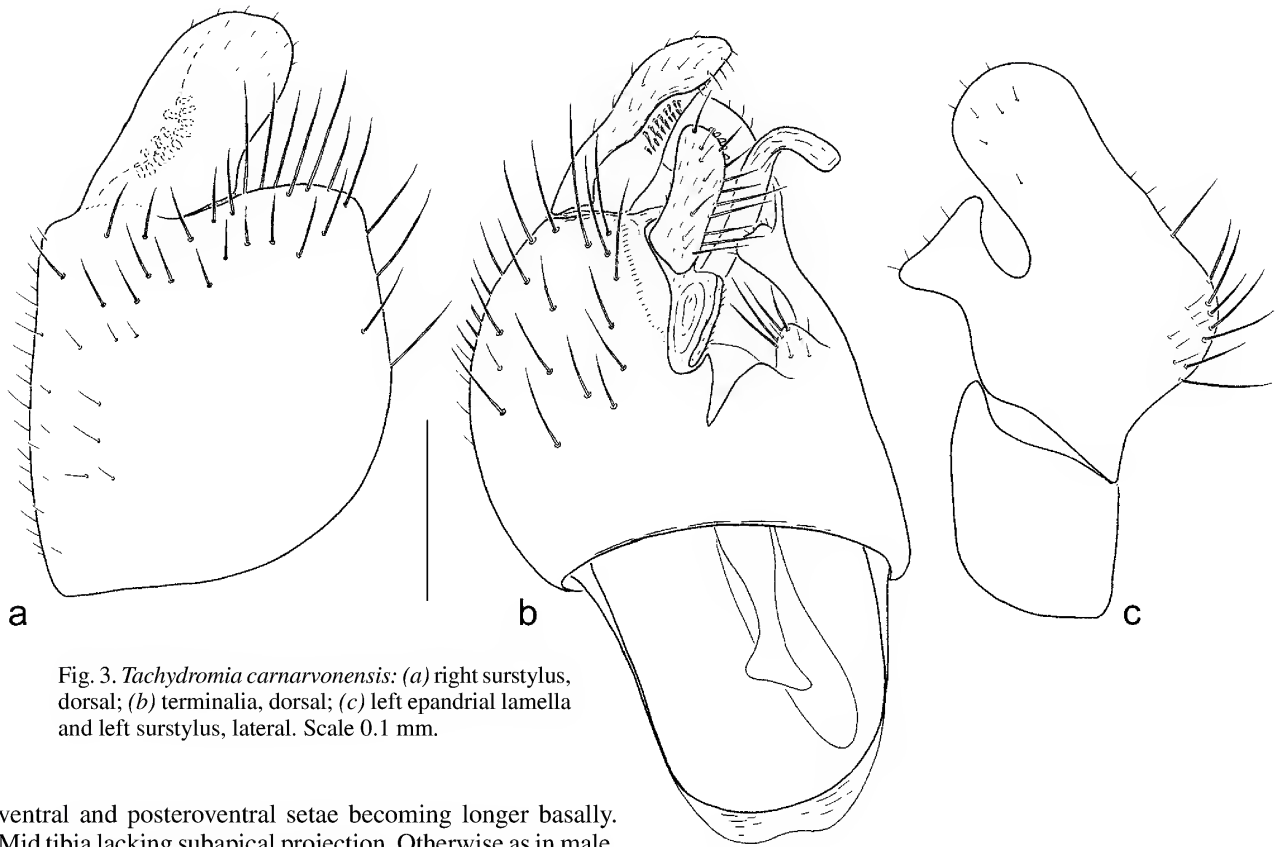


Fig. 3. *Tachydromia carnarvonensis*: (a) right surstylus, dorsal; (b) terminalia, dorsal; (c) left epandrial lamella and left surstylus, lateral. Scale 0.1 mm.

ventral and posteroventral setae becoming longer basally. Mid tibia lacking subapical projection. Otherwise as in male. Cercus brown, long, slender, covered with minute setulae.

**Etymology.** The specific name is a patronym in honour of Daniel J. Bickel (Sydney), the collector of the majority of the type series, who has contributed greatly to the knowledge of Australasian empidoid Diptera.

**Distribution.** This species is currently recorded from many localities in New South Wales and it appears to be commonest species of *Tachydromia* there. According to labels *T. bickeli* n.sp. was collected in rain forest (cool, closed or temperate; 550–1300 m) and taken from trunks of snow gum *Eucalyptus pauciflora*, *E. caniculata*, *E. saligna* and *Nothofagus* sp. on dates from middle of November to middle of February.

### *Tachydromia carnarvonensis* n.sp.

Fig. 3

**Type material.** HOLOTYPE ♂, Australia, Queensland, Carnarvon Nat. Pk, Mt. Moffat Sect. E. branch Maranoa River, nr. Top Moffat Cmp (25°03.2'S 148°03.5'E), 10–11.x.2002, J.M. Cumming, PT [QMB].

**Diagnosis.** This species can be readily recognized among Australian congeners by a short subapical seta on the palpus and largely shining thorax with prothoracic sclerites (including anterior part of postpronotal lobe) densely silvery grey pollinose.

**Description.** *Male* length 2.0 mm; wing 1.9 mm. *Head* black in ground-colour, with black setation. Eyes with posterior margin slightly produced beyond ocellar tubercle; vertex broader than frons in front of ocellar tubercle. Occiput almost entirely shining, with narrow space of fine pollinosity

between vertex and neck; vertex entirely shining; 2 inclinate, long, black postvertical setae, some setae around neck and near mouth-opening and row of minute postoculars. Ocellar tubercle shining, with 2 short laterocline setae. Frons shining, slightly widened toward ocellar tubercle, above antennae 2.0–2.5 times broader than anterior ocellus. Antenna brownish. Postpedicel elongate oval, short, with somewhat long subapical brownish stylus which is about 3.0 times as long as pedicel and postpedicel combined. Palpus unmodified, slender, pointed, nearly as long as proboscis, brownish; lacking silvery setae, with some scattered black setulae and bearing moderately long (somewhat shorter than palpus) black apical seta. *Thorax* black in ground-colour, almost entirely shining; prothoracic sclerites (including anterior part of postpronotal lobe) densely silvery grey pollinose, scutellum, metanotum and hypopleuron greyish pollinose. Postpronotal lobe large, lacking conspicuous setae. Mesonotum with 1 notopleural [missing], 1 moderately long black postalar and 2 similar scutellar setae; some minute setulae present behind postpronotal lobe; mesosternum and metasternum bare between posterior four coxae. Acrostichals lacking. Dorsocentrals partly missing, arranged in 1 row, mostly minute (including prescutellars), at least one pair on middle part strong. *Legs* long, slender, almost entirely brownish; fore and hind coxae (except extreme base), trochanters, fore and mid femora on extreme base and apex, hind femur on about basal 1/5 and tibia on extreme base yellowish; fore tarsomeres 1–3 yellowish, tarsomeres 4–5 brown, mid and hind tarsomeres becoming gradually darker from tarsomere 1 (almost entirely yellowish) to tarsomere 5. Coxae mostly with short pale hair-like setae, bearing some longer and stronger setae apically; fore coxa anteriorly, mid and hind coxae laterally silvery grey pollinose. Fore femur

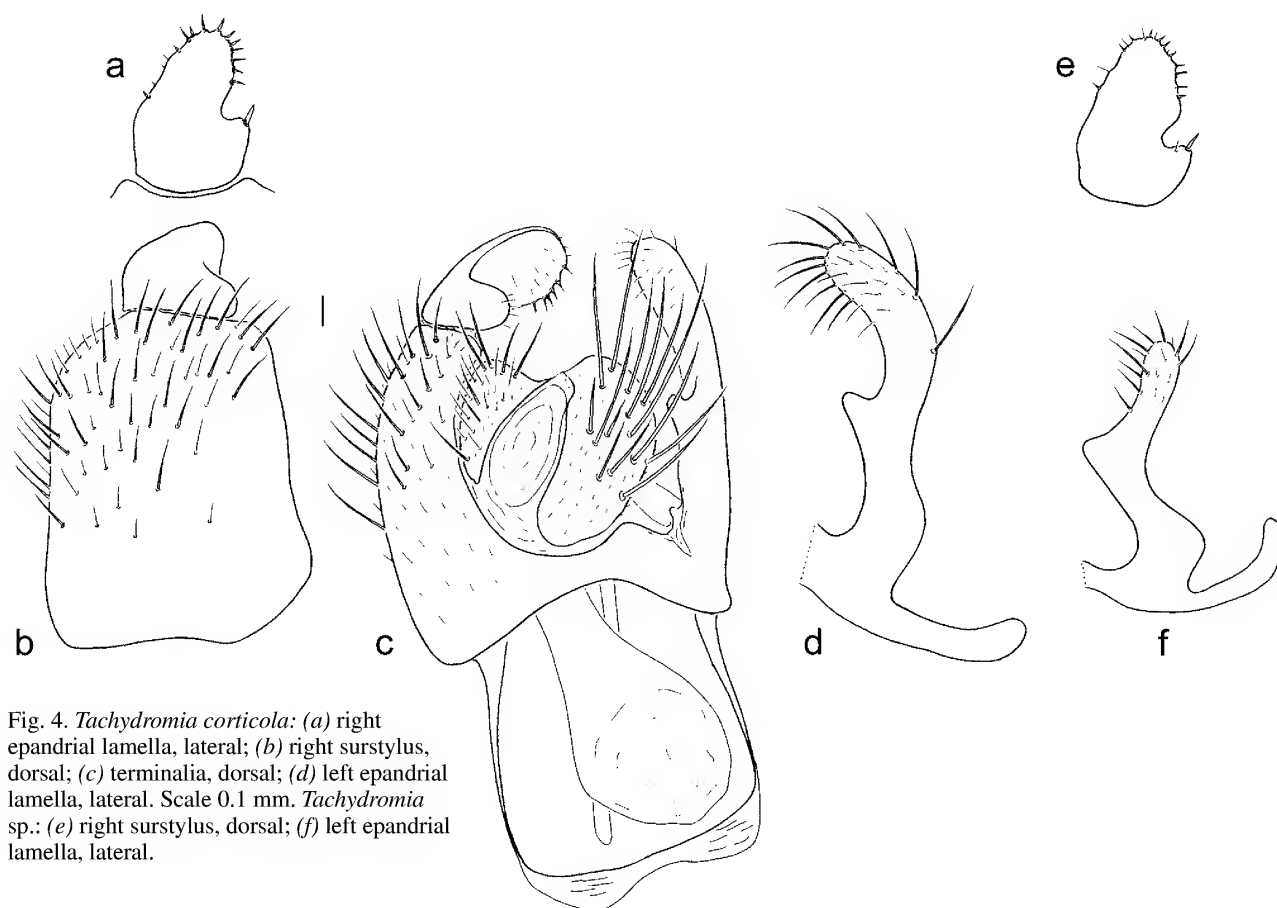


Fig. 4. *Tachydromia corticola*: (a) right epandrial lamella, lateral; (b) right surstylus, dorsal; (c) terminalia, dorsal; (d) left epandrial lamella, lateral. Scale 0.1 mm. *Tachydromia* sp.: (e) right surstylus, dorsal; (f) left epandrial lamella, lateral.

slightly thickened, pale pubescent ventrally, with minute dark anteroventral and posteroventral setulae longer basally. Fore tibia slightly spindle-shaped. Mid femur slender, with rows of anteroventral and posteroventral setae stronger on apical half of the femur. Mid tibia with hardly prominent subapical projection, bearing black ventral spinule-like setulae. Hind leg unmodified, lacking prominent setae. Wing normally developed, rounded at apex, with unmodified venation; two broad brown bands connected on cells  $r_1$  and  $r_{2+3}$  leaving narrow basal, apical and median hyaline spaces. One short costal bristle present. Vein  $R_{2+3}$  slightly arched about middle toward costa. Veins  $R_{4+5}$  and  $M_{1+2}$  parallel toward wing-apex. Crossveins r-m and bm-cu separated. Calypter pale coloured and fringed. Halter whitish. *Abdomen* entirely blackish brown; tergites subshining, finely greyish pollinose, sternites shining; with scattered minute dark setulae. *Terminalia* (Fig. 3) rather large, elongate oval, blackish brown. Right cercus rather short, subrectangular, with several setae of different lengths and bearing 5 short subapical spines on inner side. Left cercus hardly prominent, with minute setulae. Right epandrial lamella subrectangular, covered with numerous setae of different length, lacking ventral process. Right surstylus hardly differentiated from epandrium, broad, rather long, slightly curved inward, with numerous moderately long subapical setae and several spines on inner side. Left surstylus differentiated from epandrium, bilobed; upper lobe broad, rather long, with several setae of different length; lower lobe small, with several short setae. Hypandrium humped basally, lacking setae. Phallus elongate.

*Female*. Unknown.

**Etymology.** The epithet refers to Carnarvon National Park where the new species was collected.

**Distribution.** This species is currently recorded from a single locality in Queensland, taken in the beginning of October.

**Remarks.** *Tachydromia carnarvonensis* n.sp. is very similar to *T. papuana* described from Papua New Guinea (Grootaert, 1987). The main distinguishing characters between these species are given in the key.

### *Tachydromia corticola* n.sp.

Fig. 4a–d

**Type material.** HOLOTYPE ♂, Australia, Queensland, Ravensbourne NP, under bark *E. saligna*, 8.12.1985, D.J. Bickel; AMS K258776. PARATYPES: QUEENSLAND. 1♂, same data as in holotype, with additional labels; *Tachydromia* sp., det. B.J. Sinclair, 1993; AMS K258844. 1♀, same data as in holotype, with additional label; AMS K258773. 1♂, Conondale Ra., Bundaroo Creek, rainforest, G. Cassis & D. Bickel; AMS K258303. NEW SOUTH WALES. 1♀, Wentworth Falls, Blue Mts, 6.12.1986, D.K. McAlpine, K.C. Khoo, R. de Keyser; AMS K258834. 1♀, Carrai SF, 30°54'19"S 152°17'36"E, 1550 m, sticky trap on *E. campanulata*, CC-DP-018-5, 11.01–16.01.1998, E. Tasker; AMS K258854. 1♀, nr. Gosford, Mooney Mooney Ck., wet scler. forest, 3.12.1985, D.J. Bickel; AMS K258781.

**Diagnosis.** Recognized by fore and mid femora entirely yellow, hind femur yellowish basally.

**Description.** *Male* length: body 1.9–2.0 mm, wing 1.9–2.0 mm. *Head* black in ground-colour. Eyes with posterior margin produced far beyond ocellar tubercle; vertex narrower than frons in front of ocellar tubercle. Occiput including vertex almost entirely densely greyish pollinose, with shining patch behind mouth-opening; 2 inclinate, short, black postvertical setae, some pale setae around neck and near mouth-opening and row of pale minute postoculars. Ocellar tubercle pollinose, with 2 moderately long laterocline setae. Frons greyish pollinose, slightly widened toward ocellar tubercle, above antennae nearly as broad as anterior ocellus. Antenna with scape, pedicel and postpedicel dusky yellow, stylus brownish. Postpedicel drop-like, short, nearly 1.5 times as long as wide; stylus apical, very long, nearly 3.0 times as long as pedicel and postpedicel combined. Palpus unmodified, slender, rounded apically, shorter than proboscis, brownish; lacking silvery setae, with some scattered black setulae and bearing very long (nearly 2.5 times as long as palpus) black subapical seta. *Thorax* with prothoracic sclerites and anterior part of mesopleuron brownish yellow in ground-colour, otherwise thorax blackish brown in ground-colour, entirely finely greyish pollinose. Postpronotal lobe large, lacking conspicuous setae, with some minute setulae. Mesonotum with 1 black moderately long notopleural (accompanied with 1 very short seta anteriorly), 1 minute hair-like postalar and 2 scutellars (nearly as long as notopleural seta); some minute setulae present behind postpronotal lobe; mesosternum and metasternum bare between posterior four coxae. Acrostichals minute, arranged in 2 regular rows, ending before prescutellar depression. Dorsocentrals uniserial, mostly minute, prescutellar pair somewhat longer. *Legs* long, slender; hind femur brown on about apical half, fore and mid tibiae anteriorly and posteriorly brownish, hind tibia brown on apical 1/4, fore and mid tarsomere 5 brown, hind tarsomere 2 apically and hind tarsomeres 3–5 entirely brownish yellow, otherwise legs yellow to dusky yellow (basal part of hind tibia and hind basitarsus rather pale yellow). Coxae with yellowish unmodified setae, finely pollinose. Fore femur strongly thickened, pale pubescent ventrally, with yellowish anteroventral and posteroventral setulae becoming longer basally. Fore tibia slightly spindle-shaped. Mid femur slender, slightly swollen on basal half, with rows of anteroventral and posteroventral spine-like setae on swollen part (the latter darker and stronger, the former becoming longer basally) and bearing 4 even stronger black posterodorsal setae before swelling. Mid tibia with short apical projection, bearing ventral spinule-like setulae. Hind leg unmodified, lacking prominent setae. *Wing* normally developed, rounded at apex, with unmodified venation; two broad brownish bands connected on cells  $r_1$  and  $r_{2+3}$  leaving narrow basal (except extreme base), apical and median hyaline spaces. One short costal bristle present. Vein  $R_{2+3}$  straight. Veins  $R_{4+5}$  and  $M_{1+2}$  parallel toward wing-apex. Crossveins r-m and bm-cu contiguous. Calypter dusky yellow with concolorous fringe. Halter yellow. *Abdomen* largely brown in ground-colour but with segments 1–2 dusky yellow; finely greyish pollinose; covered with scattered black setae longer on pregenital segment. *Terminalia* (Fig. 4) moderately large, rather elongate oval, blackish brown. Right cercus subtriangular, with numerous unmodified moderately long setae. Left cercus larger than right cercus, elongate-oval; with numerous very long strong setae. Right

epandrial lamella subrectangular (viewed laterally), lacking ventral subapical process, with numerous unmodified setae of different lengths. Right surstylus differentiated from epandrium, bent inward, rather subrectangular but with deep notch on right upper corner, bearing several spinule-like setae apically and on inner side. Left surstylus undifferentiated from epandrium; left epandrial lamella long narrow, with short dorsal projection on about middle, bearing several long subapical ventral marginal setae. Hypandrium with subapical tubercle bearing several short setae. Phallus short.

*Female.* Mid femur unmodified, slender, with rows of short anteroventral and posteroventral setulae becoming longer basally. Mid tibia lacking apical projection. Otherwise as in male. Cercus brown, long, slender, covered with minute setulae.

**Etymology.** The epithet “*corticola*” refers to a habit of the new species “living on bark”.

**Distribution.** *Tachydromia corticola* n.sp. is currently known from several localities in New South Wales and Queensland. This species was collected in rainforest (under bark of *E. saligna*, on trunk of *E. campanulata*, 1550 m) and it was taken in December and January.

### *Tachydromia* sp.

Fig. 4e,f

**Material examined.** NEW SOUTH WALES: 2♂♂, Port Macquarie Sea Acres NR; 10 m, subtropical rainforest, malaise trap, 10–24.12.1999, G. Williams; AMS K258809 and K258729. 1♂, Dooragan NP, Nth Brother Mtn, 450 m, subtropical rainforest, malaise trap, 14–28.02.1999, G. Williams; AMS K258845. 1♂, Mt. Warning Nat. Pk., 24.11.1985, D. Bickel & G. Cassis; AMS K258324.

QUEENSLAND: 1♂, 28.204°S 153.129°E, Lamington NP, IBISCA Qld Plot# IQ-700-D, 780 m, rainforest, sticky trap 23121, 30.03.2007–2.04.2007, D. Bickel; AMS K258732.

**Remarks.** These specimens are very similar to and indistinguishable externally from *T. corticola* n.sp. There are only slight differences in structure of the male terminalia, namely in the shape of right surstylus and left epandrial lamella (Fig. 4d,e). We prefer not to rank these specimens as a separate species until a longer series is available and the range of variability is clear.

### *Tachydromia nowendociensis* n.sp.

Fig. 5

**Type material** HOLOTYPE ♂, Australia, New South Wales, 10 km SE Nowendoc, 850 m, on tree trunk, 25.03.1985, D.J. Bickel; AMS K258775. PARATYPES: New South Wales, 1♂, Wang Wauk SF nr. Wootton, 7.04.1987, D. McAlpine, B. Day, R. de Keyser; AMS K258792.

**Diagnosis.** Recognized by the fore femur being brownish on about apical half; mid and hind femora entirely brown.

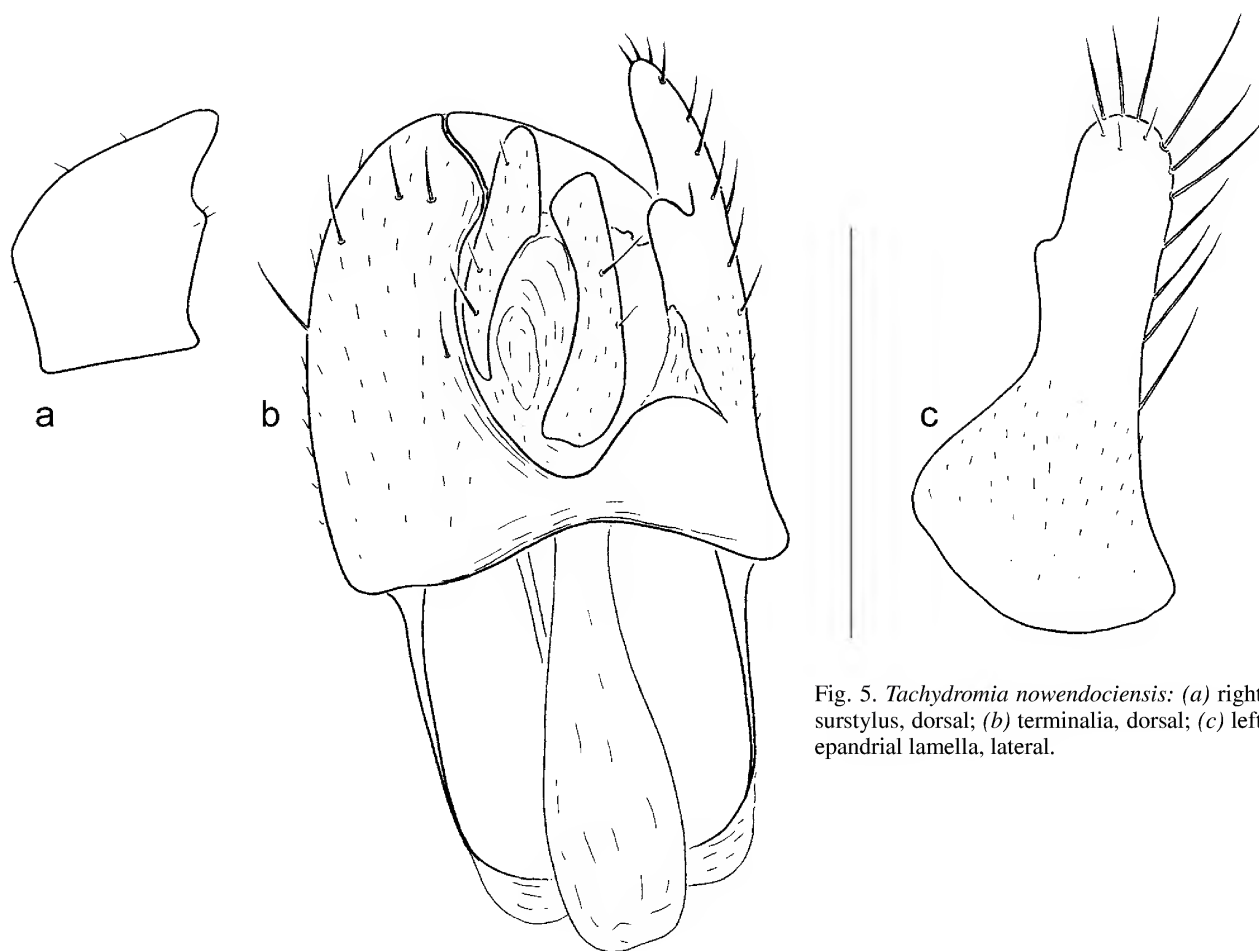


Fig. 5. *Tachydromia nowendociensis*: (a) right surstylus, dorsal; (b) terminalia, dorsal; (c) left epandrial lamella, lateral.

**Description.** *Male* length: body 1.8 mm, wing 1.7 mm. *Head* black in ground-colour. Eyes with posterior margin produced far beyond ocellar tubercle and almost touching on vertex; vertex narrower than frons in front of ocellar tubercle. Occiput including vertex almost entirely densely greyish pollinose, with shining patch below neck; 2 inclinate, short, black postvertical setae, some scattered short pale and black setae around neck and near mouth-opening and row of pale minute postoculars. Ocellar tubercle pollinose, with 2 moderately long laterocline setae. Frons greyish pollinose, slightly widened toward ocellar tubercle, above antennae slightly wider than anterior ocellus. Antenna with scape, pedicel and postpedicel dusky yellow, stylus brownish. Postpedicel drop-like, short, nearly 1.5 times as long as wide; stylus apical, very long, nearly 3.0 times as long as pedicel and postpedicel combined. Palpus unmodified, slender, rounded apically, shorter than proboscis, brownish; lacking silvery setae, with some scattered black setulae and bearing very long (nearly 1.5 times as long as palpus) black subapical seta. *Thorax* black in ground-colour, entirely finely greyish pollinose. Postpronotal lobe large, lacking conspicuous setae, with some minute setulae. Mesonotum with 1 black moderately long notopleural, 1 minute hair-like postalar and 2 cruciate scutellars (nearly as long as notopleural seta); some minute setulae present behind postpronotal lobe; mesosternum and metasternum bare between posterior four coxae. Acrostichals minute, arranged in 2 regular rows, ending before prescutellar depression. Dorsocentrals uniserial, mostly minute, prescutellar pair somewhat longer.

*Legs* long, slender, with brown and yellow pattern; coxae and trochanters entirely yellow, fore femur brownish on about apical half (broader dorsally), mid and hind femora entirely brown, fore knees yellowish, fore tibia (except dorsal face) and mid tibia brownish, hind tibia brown on apical 1/3 and brownish yellow on basal 1/3, fore and mid tarsomeres 1–3 yellowish, tarsomeres 4–5 brownish yellow, hind basitarsus yellow (except brownish yellow apex), tarsomeres 2–5 brownish. Coxae with yellowish unmodified setae, finely pollinose. Fore femur thickened, pale pubescent ventrally, with dark anteroventral and posteroventral setulae becoming longer and paler basally. Fore tibia spindle-shaped. Mid femur slender, with hardly prominent swelling near base, bearing rows of short anteroventral and posteroventral spine-like setae basally (the latter somewhat stronger basally). Mid tibia with hardly prominent apical projection and ventral spinule-like setulae. Hind leg unmodified, lacking prominent setae. *Wing* normally developed, rounded at apex, with unmodified venation; two broad brownish bands connected on cells  $r_1$  and  $r_{2+3}$  leaving narrow basal (except extreme base), apical and median hyaline spaces. One short costal bristle present. Vein  $R_{2+3}$  straight. Veins  $R_{4+5}$  and  $M_{1+2}$  parallel toward wing-apex. Crossveins r-m and bm-cu almost contiguous. Calypter dusky yellow with concolorous fringe. Halter with yellow stem and pale knob. *Abdomen* brown in ground-colour, finely greyish pollinose, covered with scattered black setae longer on pregenital segment. *Terminalia* (Fig. 5) moderately large, rather elongate oval, blackish brown. Right cercus elongate subtriangular, with

unmodified short setae. Left cercus nearly as long as right cercus, subrectangular, narrow; with several unmodified setae of different lengths. Right epandrial lamella subtriangular (viewed laterally), lacking ventral subapical process, with several unmodified setae of different lengths. Right surstylus differentiated from epandrium, bent inward, rather subtriangular, bearing several spinule-like setulae apically and on inner side. Left surstylus undifferentiated from epandrium; left epandrial lamella subtriangular, with hardly prominent dorsal projection on about middle, bearing several long subapical marginal setae. Hypandrium with 3 very short setae. Phallus short.

*Female.* Unknown.

**Etymology.** The specific epithet refers to the type locality of the new species, Nowendoc.

**Distribution.** *Tachydromia nowendociensis* n.sp. is currently known from two localities in New South Wales. The new species was taken from tree trunks (850 m) at the end of March and in the beginning of April.

### *Tachydromia papuana* Grootaert, 1987

*Tachydromia papuana* Grootaert, 1987: 141, figs 1–7.

**Material examined.** NEW GUINEA: 1♂, N. Guinea: SE Popondetta Area, Sambogo Riv. 11.04.1972; River Margip; J.A. Tenorio coll. (BPBM).

**Remarks.** Grootaert (1987) described this species after three male specimens taken from Madang Province of Papua New Guinea. We re-examined the type material of *T. papuana* and have found that a specimen obtained from BPBM is conspecific. The female of this species remains unknown.

**Distribution.** Papua New Guinea.

### *Tachydromia* sp. undetermined

**Material examined.** NEW SOUTH WALES: 1♀, Dooragan NP, Nth Brother Mtn, 450 m, subtropical rainforest, malaise trap, 28.01–13.02.1999, G. Williams; AMS K258873. 1♀, Dooragan NP, Nth Brother Mtn, 450 m, subtropical rainforest, malaise trap, 29.12.1998–14.01.1999, G. Williams; AMS K258754. 1♀, Dooragan NP, Nth Brother Mtn, 450 m, subtropical rainforest, malaise trap, 14–28.02.1999, G. Williams; AMS K258817. 2 ♀♀, Dooragan NP, Nth Brother Mtn, 450 m, subtropical rainforest, malaise trap, 1–30.03.1999, G. Williams; AMS K258757, K258764. 1♀, Dooragan NP, Nth Brother Mtn, 450 m, subtropical rainforest, malaise trap, 25.11–24.12.1999, G. Williams; AMS K258741. 1♀, Port Macquarie; Sea Acres NR, 0–10 m, subtropical rainforest, malaise trap, 26.01–13.02.1999, G. Williams; AMS K258818. 1♀, Port Macquarie; Sea Acres NR, 0–10 m, subtropical rainforest, malaise trap, 25.11–10.12.1999, G. Williams; AMS K258736.

**Remarks.** We could not associate these female specimens with males of any species mostly due to their poor condition after drying. Nevertheless, we included this material to provide additional data on the occurrence of *Tachydromia* in Australia.

## Discussion

Currently six species of the genus *Tachydromia* are recorded from Australasia, including five species from Australia, which have been described in this paper, and a single species from Papua New Guinea. No species of *Tachydromia* have been found from New Zealand and Tasmania, but some untreated materials were collected from Fiji (Sinclair, pers. comm.) It is a bit surprising because many of these areas have been extensively surveyed and Tachydromiinae are well represented in samples, e.g., *Elaphropeza* Macquart and some other Drapetini.

A phylogenetic analysis of the relationships of the Australasian species of *Tachydromia* will be presented in a separate paper covering the entire group. However, we would like to give here some preliminary remarks. Australasian species of *Tachydromia* could be separated into two complexes. Five continental species belong to the *T. luang* group and form a sister-complex to species of this group that are known from Southeast Asia (Shamshev & Grootaert, 2008). Whereas *T. carnarvonensis* n.sp. (together with *T. doi*, *T. papuana*, *T. monocercus* Shamshev & Grootaert, 2008 [Thailand] and *T. mengyangensis* Grootaert, Yang & Shamshev, 2008 [China, Yunnan]) is a member of a well-supported complex of species showing some affinity to the *T. terricola* group *sensu* Chvála (1970).

It is interesting to note that species of these two complexes appear to differ from each other in their habits. *Tachydromia papuana* was taken in lowlands and swept above fine gravel along the banks of a small river. Nothing is known about *T. carnarvonensis* n.sp. but label data indicates that this species was also collected near a river. We can add that *T. mengyangensis* (China) belonging to this species complex was taken also along forest streams (Grootaert *et al.*, 2008). Some Palaearctic species of *Tachydromia* are known to occur along rivers and streams running on gravel and stones (Chvála, 1970). The remaining Australian species of *Tachydromia* were collected from tree trunks (mostly *Eucalyptus*) of cool and rainforests in mountains and submontane areas of the Great Dividing Range.

Current zoogeographical patterns and their possible history in *Tachydromia* will be a subject of a separate paper planned by the authors. The genus is currently only confined to eastern Australia, and we hypothesise here that the Australasian species possibly originated from dispersal of ancestral populations southwards from Southeast Asia.

**ACKNOWLEDGMENTS.** The authors are indebted to Daniel Bickel (Australian Museum, Sydney), Neal Evenhuis (Bishop Museum, Honolulu, Hawaii, USA) and Jeffrey Cumming, Bradley Sinclair and Scott Brooks (Agriculture and Agri-Food Canada, Ottawa) for providing us materials for our study. Bradley Sinclair and Adrian Plant gave valuable comments on the manuscript.

## References

- Chvála, M., 1970. Revision of Palaearctic species of the genus *Tachydromia* Meig. (= *Tachista* Loew) (Diptera, Empididae). *Acta Entomologica Musei Nacionalis Pragae* 38 (1969): 415–524.
- Grootaert, P., 1987. A new *Tachydromia* species from Papua New Guinea (Diptera, Empidoidea, Hybotidae). *Bulletin et Annales de la Société royale belge d'Entomologie* 123: 141–144.
- Grootaert, P., D. Yang, & I. Shamshev, 2008. *Tachydromia* Meigen, 1803 (Diptera: Hybotidae) from Yunnan, China. *Annales Zoologici (Warszawa)* 58: 561–566.
- McAlpine, J.F., 1981. Morphology and terminology—Adults [Chapter] 2. In *Manual of Nearctic Diptera*, volume 1, coord. J.F. McAlpine, B.V. Peterson, G.E. Shewell, H.J. Teskey, J.R. Vockeroth, & D.M. Wood, *Agriculture Canada Monograph* 27: 9–63.
- Shamshev, I., & P. Grootaert, 2005. The genus *Tachydromia* Meigen (Diptera: Hybotidae) from South East Asia, with the description of three new species. *Studia Dipterologica* 12: 109–117.
- Shamshev, I., & P. Grootaert, 2008. New and little-known species of the genus *Tachydromia* Meigen (Diptera, Hybotidae) from Thailand. *Zootaxa* 1830: 21–36.
- Sinclair, B.J., & J.M. Cumming, 2006. The morphology, higher-level phylogeny and classification of the Empidoidea (Diptera). *Zootaxa* 1180: 1–172.
- Stuckenberg, B.R., 1999. Antennal evolution in the Brachycera (Diptera), with a reassessment of terminology relating to the flagellum. *Studia Dipterologica* 6: 33–48.

Manuscript submitted 2 April 2009, revised 6 January 2011.